EPSOLAR

Solar Charge Controller & LED Driver

USER MANUAL

Thank you very much for selecting our product!
This manual offers important information and suggestions with respect to installation, use and troubleshooting, etc. Please read this manual carefully before using the product and pay attention to the safety recommendations in it.

LandStar

Solar Charge Controller & LED Driver

Nominal system voltage			12/24VDC*	
Maximum PV input voltage			50V	
Nominal charge current:				
LS102460BPLD			10A	
LS2024100BPLD			20A	
Nominal output power / output current:				
LS102460BPLD	30W/12V		60W/24V	2.0A
LS2024100BPLD	50W/12V		100W/24V	3.3A

*The solar charge controller has the automatic recognized 12/24VDC system voltage function. Most of parameters about discharge and LED load control could be modified.

Warranty: The controller is warranted to be free from defects for a period of two (2) years from the date of shipment to the original end user.

Notice: Manufacture is not responsible for the damage of any part of controller due to operator's misuse, battery parameters mismatch, unreasonable system configuration, unauthorized repair or exceeding the specified parameters.

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1 Important Safety Information

Please inspect the controller thoroughly after it is delivered. If any damage is seen, please notify the shipping company or our company immediately.

2 General Information

LandStarBPLD series solar charge controller combines the solar charge controller and LED constant current driver into one unit which is ideal for solar LED lighting, especially for the application for LED lamp which requires dimmer function, road lighting, cityscape lighting and advertising lighting. It has some excellent feathers including the high efficiency and accuracy, small size, potting waterproof and editable load control parameters.

- 12/24VDC automatic recognized system voltage.
- Optional battery type among Gel, Sealed (default) and Flooded.
- Wide battery voltage range: 8VDC ~ 32VDC, compatible with 12/24VDC full voltage range.
- Digital precision constant current control and the control accuracy better than 10mA.
- Maximum output efficiency is above 97%.
- The output current can be adjusted among the rated power and current range.
- LandStarBPLD has one key and two segment numerical LED displays (LED1 and LED2). The discharging control parameters and the control mode of the load can be modified by the key; meanwhile LED displays running information of system.
- Electronic protection: overheating, reversed polarity protection and load short circuit, etc.

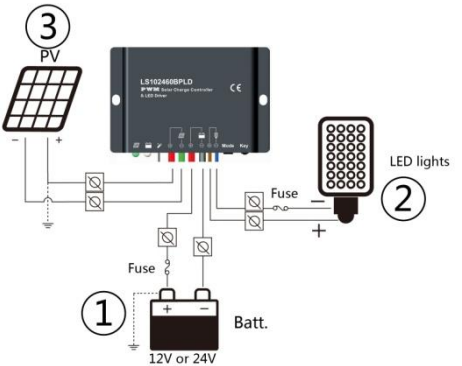
- Load control parameter and output current value can be set separately.
- IP67 protection.

3 Installation Instructions

3.1 General Installation Notes

- Be very careful when working with batteries. Wear eye protection. Have fresh water available to wash and clean any contact with battery acid.
- Never short the battery positive and negative terminals and wires which may cause explosion or fire.
- Install external fuses/breakers as required.
- Disconnect the solar module and fuses/breakers near to battery before installing or adjusting the controller.
- Confirm that power connections are tightened to avoid excessive heating from loose connection.
- Uses insulated tools and avoid placing metal objects near the batteries.
- Loose power connections and/or corroded wires may result in resistive connections that may melt wire insulation, burn surrounding materials, or even cause fire. Ensure tight connections and use cable clamps to secure cables and prevent them from swaying in mobile applications.
- Only Gel, Sealed and Flooded type batteries can be charged.
- Battery connection may be wired to one battery or a bank of batteries. The following instructions refer to a singular battery, but it is implied that the battery connection can be made to either one battery or a group of batteries in a battery bank.

3.2 Wiring

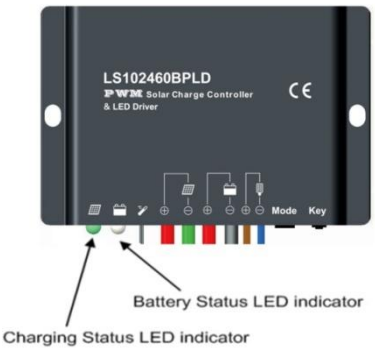


1. Connect components to the charge controller in the sequence as shown in above picture and pay much attention to the "+"(Red) and "-"(Black). Always power the battery First.

2. After power the battery, check the battery indicator on the controller, it will be green. If it's not green, please refer to chapter 6.

3. The battery fuses should be installed as close to battery as possible and it suggests that the distance is less than 150mm.

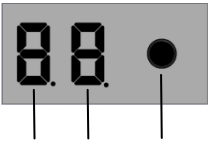
4 Operation



Indicator Status Description

	Green	On solid	Normal
	Green	Slowly flashing	In charging
	Green	OFF	No charge
	Green	On solid	Normal
	Green	Slowly flashing	Full
	Green	Fast flashing	Over voltage
	Orange	On solid	Under voltage
	Red	On solid	Over discharged
	Red	Flashing	Battery overheating
Charging and battery indicator (red) flashing simultaneously			System voltage error
Charging and battery indicator(orange) flashing simultaneously			Controller overheating

5 Setting Operation



LED1 is used to show parameter, LED2 is used to show corresponding setting value. LEDs are used to show error code. The parameters of controller can be set via the key, and the setting method is shown as follow:

(1) The LEDs are off after powering on the controller. When LEDs are in OFF state, pressing the key can switch on or off the load only when the load mode is "Output mode 1".

(2) Press the key and hold on 5 seconds to enter control mode menu with LEDs on. Press the key to roll the item in circle.

(3) Press the key to roll the item in the control mode menu and hold on 5 seconds to enter edit mode with the LED2 flashing. Add the value by pressing the key. Save the data and return to the menu with no operation over 5 seconds.

(4) LEDs will be OFF with no operation over 10 seconds.

- The reference of LED for parameter and setting value is shown in the table.

LED1	Item	LED2		Content
		Default	Range	
1	Battery type	**1**	**1-3**	1: Sealed 2: Gel 3: Flooded
2	LVD	**8**	**0-4.**	10.6V-12.0V accuracy0.1V(x2/24V)

3	Load set	**0**	**0-4**	0:Light ON 1:Light ON +Time mode 2:Output mode1 3:Output mode2 4:Test mode
4	Light ON/OFF threshold voltage	**5**	**1-7.**	1-17V(x2/24V)
5	Light ON +Time mode1:TIME1	**5**	**0-4.**	0-14H, accuracy 1H
6	Light ON +Time mode2:TIME2	**5**	**0-4.**	0-14H, accuracy 1H
7	Light ON +Time mode3:TIME3	**1**	**0-4.**	0-14H, accuracy 1H
1.	Number of LED parallel group	**1**	**1-0.**	1-10 groups
2.	Light ON+ Time mode select	**1**	**1-2**	Mode1 Mode2
3.	TIME1 percent	**0.**	**0-0.**	0%-100% ,accuracy 10%
4.	TIME2 percent	**5**	**0-0.**	0%-100% ,accuracy 10%
5.	TIME3 percent	**0**	**0-0.**	0%-100% ,accuracy 10%
0.	Single LED string current	**3.**	**0-9.**	200-390mA,accuracy10mA (Default: 330mA)

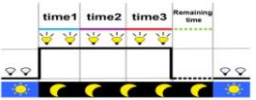
Note:

1. Radix point of LED segment display indicate the value added "10", for example 0.=10,4.=14.
2. Test Mode is as same as Light Control Mode but no delay. Therefore, test mode is only used to test load switch. No operation will automatically exit, it can return to the previous mode within 120 seconds.
3. Low Voltage Reconnect Voltage =Low Voltage Disconnect Voltage+0.5V/12V(x2/24V).
4. Output mode1：The key is enabled.
   Output mode 2：The key is disabled.
5. It can be set the Day Time Threshold Voltage (DTTV) and Night Time Threshold Voltage (NTTV), DTTV equal to NTTV.
6. LED Total current=Number of LED parallel group×Single

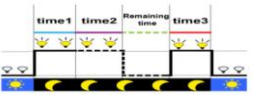
LED string current.

Note：If the total load current exceeds the rated current, the system will work with the rated current.

7. Mode 1



Mode 2



- The reference of LED for error code is shown in the table

Fault and warning code	Detail of fault, warning, working state code	
E1	Fully protected against battery over discharged and voltage is lower over discharge point	If fault and working state on left appear, corresponding code will be displayed. Several states occur at the same time, these code will be displayed circularly (interval 1s). Only one state occurs, the code flashes per 1s. You can enter setting mode and set parameters despite the error shows
E2	Fully protected against battery over discharged and voltage is lower over discharge point without getting to back point	
E3	Load over load	
E4	Load short circuit	
E5	Open load	
“ ” (radix point)	The radix point of LED1 lighting up indicates that load is open. Oppositely, load is closed	Load state (radix point) will conceal during fault displaying and parameter setting

6 Protection and Troubleshooting

6.1 Protection

PV Array Short Circuit

If PV array short circuit occurs, clear it to resume normal charge automatically.

Load Overload

If the load current exceeds the rated output current of controller(≥1.05 times rated discharge current), the controller will disconnect the load. Once the overload occurs, the way to solve is to press the key to clear error or reset the controller after reducing the load.

Load Short Circuit

Fully protected against load wiring short-circuit (≥2 times rated output current). After five automatic load reconnect attempts, the fault must be cleared by pressing the key or restarting the controller.

PV Reverse Polarity

Fully protection against PV reverse polarity, no damage to the controller will result. Correct the miswire to resume normal operation.

Battery Reverse Polarity

Fully protection against battery reverse polarity, no damage to the controller will result. Correct the miswire to resume normal operation.

Battery working voltage error

If battery voltage does not match controller working voltage, controller will stop working. After correcting the voltage, the fault must be cleared by restarting the controller.

Damaged Local Temperature Sensor

If the temperature sensor short-circuited or damaged, the controller will be charging or discharging at the default temperature 25°C to prevent the battery damaged from overcharging or over discharged.

Overheating Protection

If the temperature of the controller heat sink exceeds 85°C, the controller will automatically start the overheating protection and stop the charging and discharging. When the temperature is below 75°C, the controller will resume to work.

High Voltage Transients

PV is protected against small high voltage surge. In lightning prone areas, additional external suppression is recommended.

Note: The controller has daily automatic fault clear function which will reduce the manual operation and can intelligently eliminate the fault caused by non-actual hardware failure.

6.2 Troubleshooting

Faults	Possible reasons	Troubleshooting
Charging LED indicator off during daytime when sunshine falls on PV modules properly	PV array disconnection	Check that PV and battery wire connections are correct and tight
Green battery LED indicator fast flashing	Battery voltage higher than over voltage disconnect voltage(OVD)	Check the battery voltage. If it over high, disconnect the solar module immediately and change a new controller
Battery LED indicators orange	Battery under voltage	Load output is normal. Battery LED indicator will return to green automatically when fully charged
Battery LED	Battery	The controller cut off the output

indicators red color and loads not working	over discharged	automatically. LED indicator will return to green automatically when fully charged
Load abnormal shutdown	Over load	Remove or cut out the additional load. Press the key to clear error and the controller will resume to work after 3s or restart the controller
	Short circuit	Clear short circuit. Press the key to clear error and the controller will resume to work after 3s or restart the controller
All the led indicator flashing (battery orange indicator flashing)	Too high temperature of controller	When heat sink of the controller exceeds 85°C, the controller will automatically cut input and output circuit. When the temperature below 75°C, the controller will resume to work. Please reduce the environment temperature, the power of solar module or the power of the load
All the led indicator flashing (battery red indicator flashing)	System voltage error	Check whether the battery voltage match with the controller working voltage. Please change to a suitable battery or reset the working voltage

7 Technical Specifications

Electrical parameters

LS******BPLD	102460	2024100
Nominal system voltage	12/24VDC	
Max. PV input voltage	50V	
Battery terminal voltage	8 ~ 32V	
Rated charge current	10A	20A
Rated output power	30W/12V 60W/24V	50W/12V100W/24V
Rated output Current	2.0A	3.3A
Max efficiency	96%	97%
Output voltage range	Voltage of battery+2V ~ 60V	
Load open circuit voltage	60V	
Power output adjustment time	<5s	
Self-consumption	9.4mA/12V;12.2mA/24V	8mA/12V;7mA/24V
Control accuracy	10mA	
Temperature compensation coefficient	-3mV/°C/2V(25°C)	

Battery Voltage Parameters (parameters is in 12V system at 25°C, please use double value in 24V system)

Battery charging setting item	Sealed	Gel	Flooded
Over Voltage Disconnect Voltage	16V	16V	16V
Charging Limit Voltage	15V	15V	15V
Over Voltage Reconnect Voltage	15V	15V	15V
Equalize Charging Voltage	14.6V	——	14.8V
Boost Charging Voltage	14.4V	14.2V	14.6V
Float Charging Voltage	13.8V	13.8V	13.8V
Boost Reconnect Charging Voltage	13.2V	13.2V	13.2V

Low Voltage Reconnect Voltage	11.9V	11.9V	11.9V
Under Voltage Warning Reconnect Voltage	12.2V	12.2V	12.2V
Under Voltage Warning Voltage	12V	12V	12V
Low Voltage Disconnect Voltage	11.4V	11.4V	11.4V
Discharging Limit Voltage	10.6V	10.6V	10.6V
Equalize Duration	2 hours	——	2 hours
Boost Duration	2 hours	2 hours	2 hours

Notes: The default battery type is Sealed. For Gel, Sealed, Flooded battery type, the voltage point is fixed, unable to modify it.

***Please carefully to select battery type. It will damage battery if the setting is incorrect.**

Environmental parameters

Environmental parameters	Parameter
Working temperature	-35°C ~ +55°C
Storage temperature	-35°C ~ +80°C
Enclosure	IP67

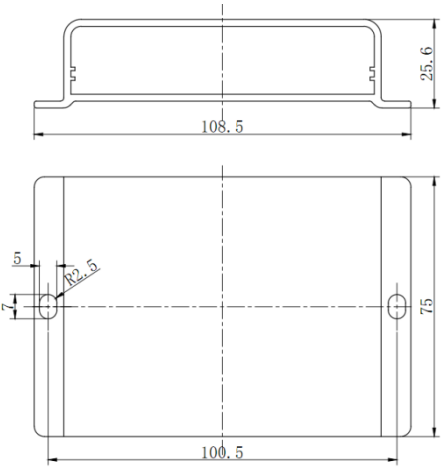
LS102460BPLD mechanical parameters

Mechanical parameter	Parameter
Overall dimension	108.5x75x25.6mm
Mounting dimension	100.5 mm
Mounting hole size	Φ5
Power cable	$4mm^2$(PV/ Batt.)$1.0mm^2$(Load)
Net weight	0.36 kg

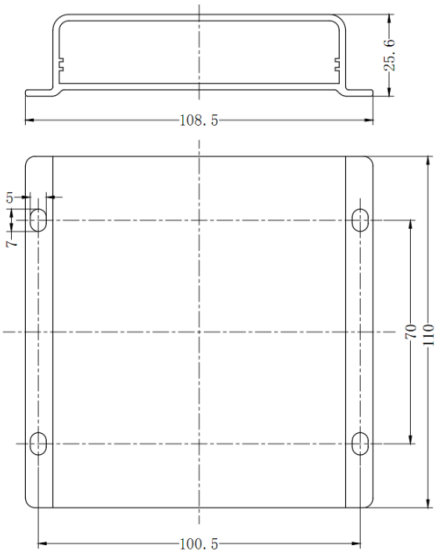
LS2024100BPLD mechanical parameters

Mechanical parameter	Parameter
Overall dimension	108.5x110x25.6 mm
Mounting dimension	100.5*70 mm
Mounting hole size	Φ5
Power cable	$6mm^2$(PV/Batt.)$1.5mm^2$(Load)
Net weight	0.5 kg

Annex: Mechanical dimensions



LS102460BPLD Dimensions (mm)



LS2024100BPLD Dimensions (mm)

Final interpretation right of the manual belongs to our company.

Any changes without prior notice!

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